

# Curbside Collection Comparison for Blue Bags, Boxes and Carts – a study of containers.

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## **Objective**

- To better understand the effectiveness of different Recycling Collection Systems
  - Blue Bags, Blue Boxes & Wheeled Carts
  - Analysis included resident satisfaction, diversion rates, collection and processing costs

## **Companies Involved**

- VisionQuest Environmental Strategies Corp. – Project Management (on behalf of the Clorox Company of Canada Ltd. – GLAD)
- Entec Consulting Ltd. (Bob Graham) – Engineering & Technical Firm
- Synovate Research Services – Consumer Behaviour Research Firm

# **RESIDENT SATISFACTION**

# Research Overview

## Methodology

- Online data collection using Synovate's Online Panel of Canadians and partner panels

## Target Audience

- Age 18+, primarily responsible for handling recycling at home
- Only residents of single family dwellings

## Target Audience

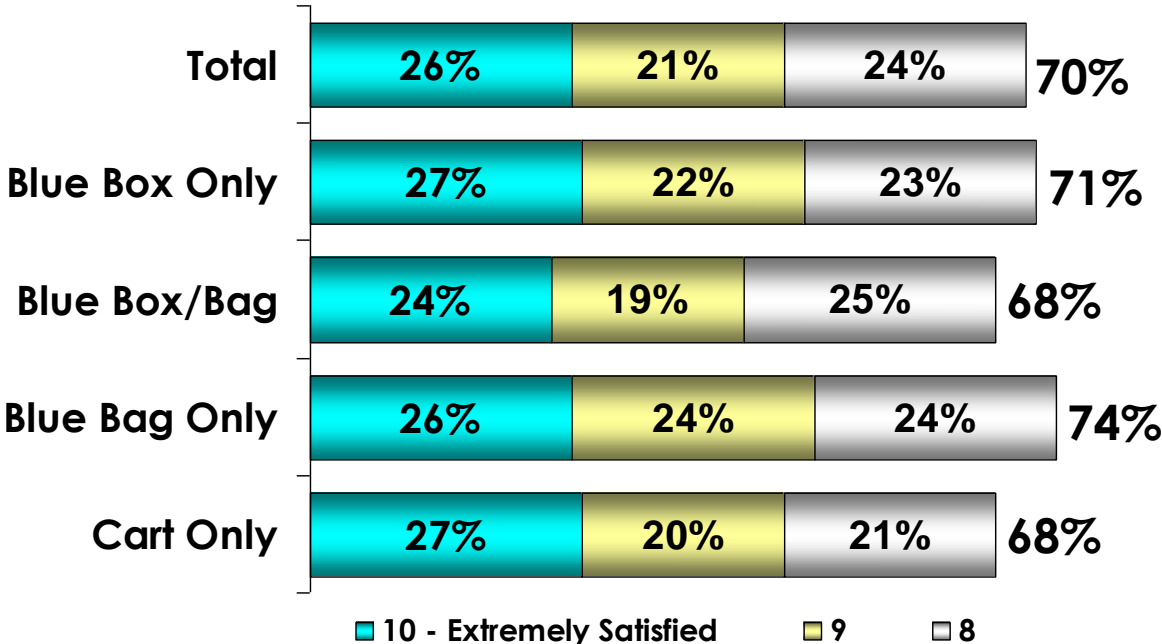
- Summary of Sample Breakdown by type of Recycling Collection System

Cell Description	# in Cell	Source of Sample from Select Markets
Blue Bag only	214	Edmonton, Halifax, Charlottetown, Guelph
Combo Market - Blue Bag, Blue Box or both	507	Peel, Niagara, London, Muskoka & Northumberland
Blue Box only	341	York, Durham, Waterloo, Windsor, Kingston & Ottawa
Cart only	213	Calgary, Toronto & Kelowna
<b>Total</b>	<b>1275</b>	

Source: Synovate 2010

# No Recycling Collection System was Preferred

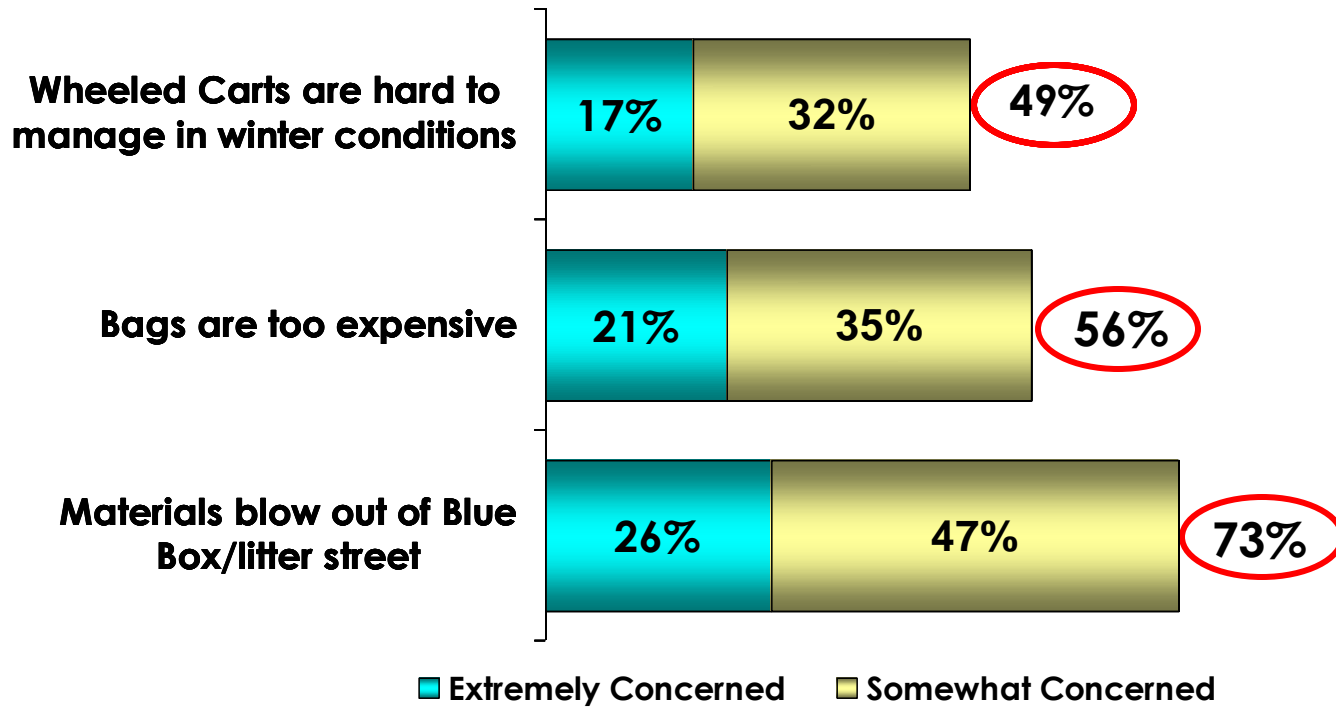
% Residents Satisfied with Municipal Collection System for Recycling



R.11.1 How satisfied are you with your municipality's collection system for recycling (Scale of 1 to 10: 1=Not at all satisfied, 10=Extremely Satisfied)

Source: Synovate 2010

# Resident's Greatest Concerns



R12. For each of the following problems, please indicate how concerned you are with regard to managing your recycling.  
(Extremely Concerned/Somewhat Concerned/Not at all Concerned)

Source: Synovate 2010



# **CURBSIDE RECYCLING SYSTEM COSTS**

# Study Background

## § Programs Investigated:

- Edmonton (bag)
- Calgary (cart)
- Charlottetown (bag)
- Plateau Mont-Royal (Montreal bag)
- New York City (no site visit)

## § MRFs Investigated:

- Edmonton, AB
- Guelph, ON
- Northumberland County, ON
- Peel Region, ON
- Charlottetown, PEI

- Curbside collection models prepared for household sizes of 400,000; 300,000; 200,000; 100,000; 50,000 and 25,000 using Entec's proprietary collection model for:
  - Weekly & Bi-weekly Bag Collection
  - Weekly & Bi-weekly Automated Cart Collection
  - Weekly Blue Box Collection

*Source: Entec Consulting Ltd. 2010*

# Collection & Processing Cost Inputs

## Collection:

- Blue Box recovery and composition data - [Halton Region 2007 audits](#)
- Recovery ratios for curbside Box, Cart and Bag collections - [City of Toronto 2009 Container Pilot Study](#)
- Blue Box set out rates & stop times - [Markham Model Community \(1994\)](#)
- Bag and auto cart stop times - [field monitoring in Edmonton & Calgary, respectively](#)
- Vehicle capital and operating costs e.g. fuel, labour, maintenance & etc. - [Entec Database](#)
- Representative container capital and replacement costs - [Entec database](#)

## Processing:

- MRF capital and operating costs developed for single and dual stream MRFs for four MRF sizes: 100,000; 75,000; 50,000 and 25,000 tonnes/yr using:
  - Representative capital and operating costs
  - Representative material sales prices ([CSR April 2010 price sheet](#))
  - Bag breaking and film removal productivity and costs ([2010 BCA Blue Bag Study](#))

*Source: Entec Consulting Ltd. 2010*

# Collection Model Input Data

Item	SS W Cart	SS BW Cart	SS W Bag	SS BW Bag	Baseline W 2St
Toronto Recovery Ratio	1.08	1.11	1.06	1.08	1.00
2010 Total Stop Time (sec)	14.7	14.7	8.4	9.2	21.8
Set Out Rates	78%	92%	68%	80%	67%
Vehicle	Labrie Cool Hand	Labrie Cool Hand	Side Load Packer	Side Load Packer	Labrie OTT
Vehicle Capacity (m <sup>3</sup> )	25.5	25.5	29.8	29.8	26.8

## Bag Data

Waste Stream	Kg/bag	\$/bag	\$/hh/yr
Large Blue Bag	7	\$0.15	\$5.48*

\* Equivalent to 36 bags / yr avg.

## Cart Data

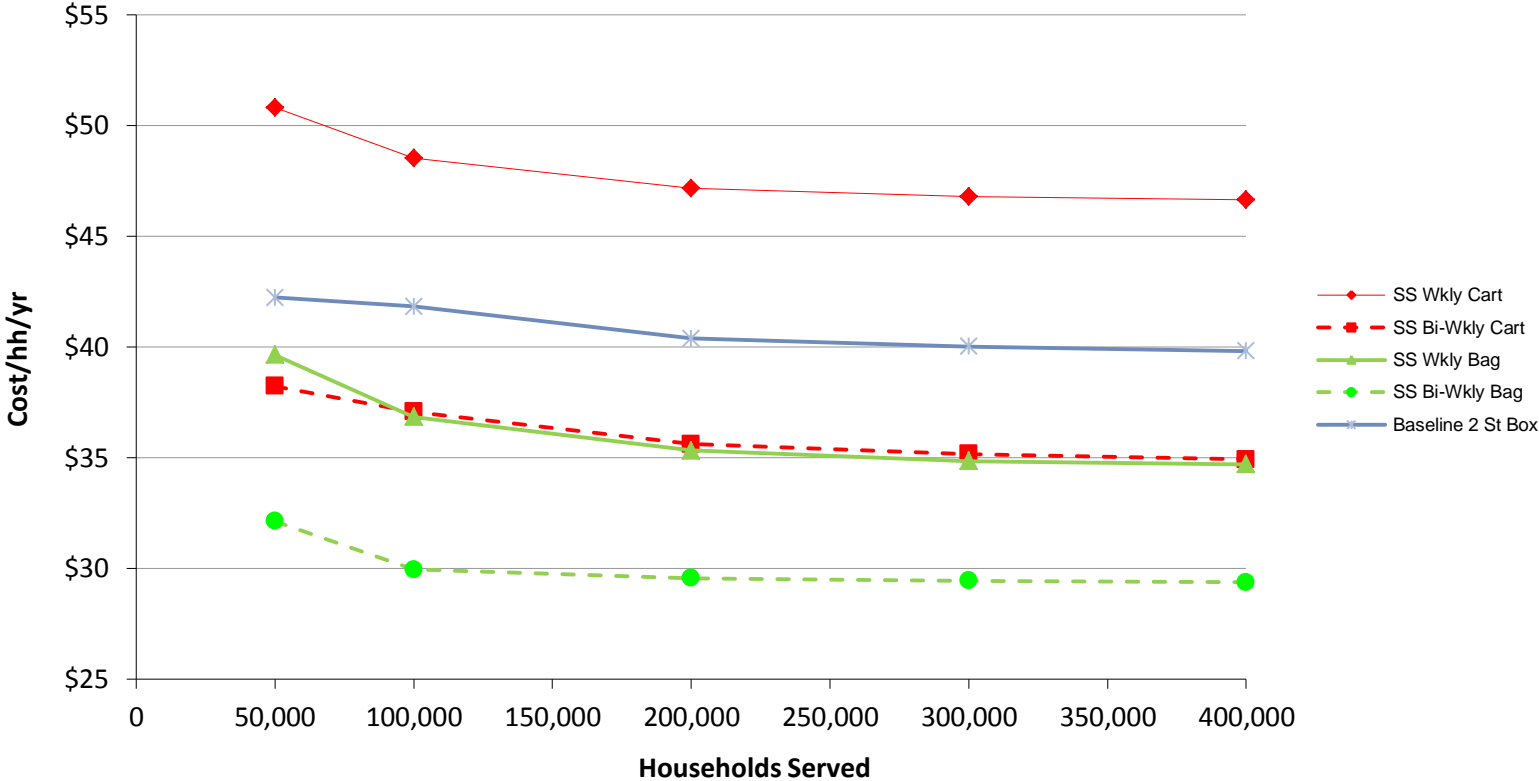
Item	Capital Cost	\$/hh/yr
240 litre carts	\$50	\$6.48
interest rate	5%	
life (yrs)	10	
Cart Wt (kg)	10	
Disposal Cost (\$/tonne)	\$100	\$0.10

## Box Data

Item	Capital Cost	\$/hh/yr
blue box	\$8	\$1.38
interest rate	5%	
life (yrs)	7	
Cart Wt (kg)	2.27	
Disposal Cost (\$/tonne)	\$100	\$0.02

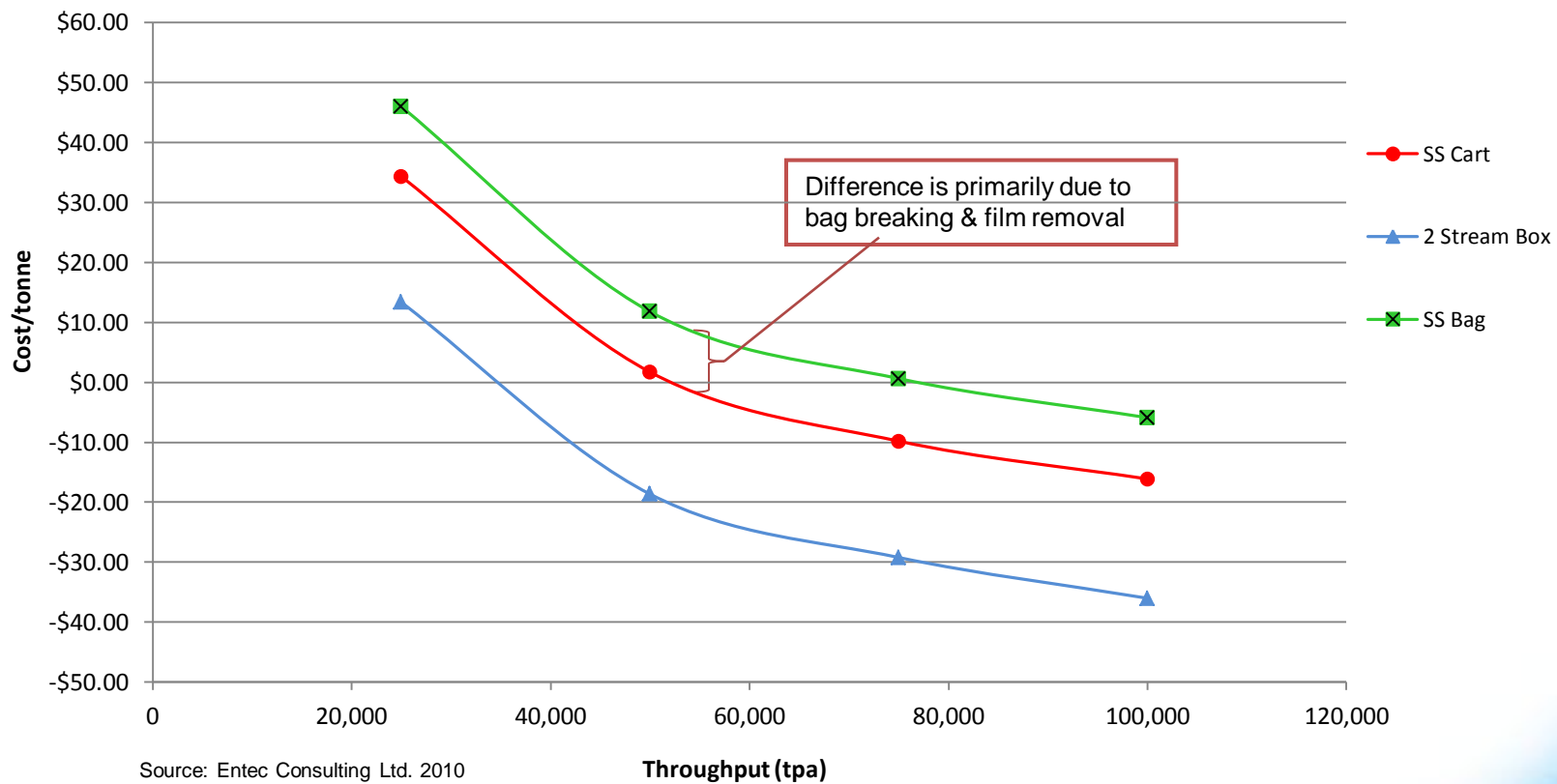
Source: Entec Consulting Ltd. 2010

# Collection System Costs

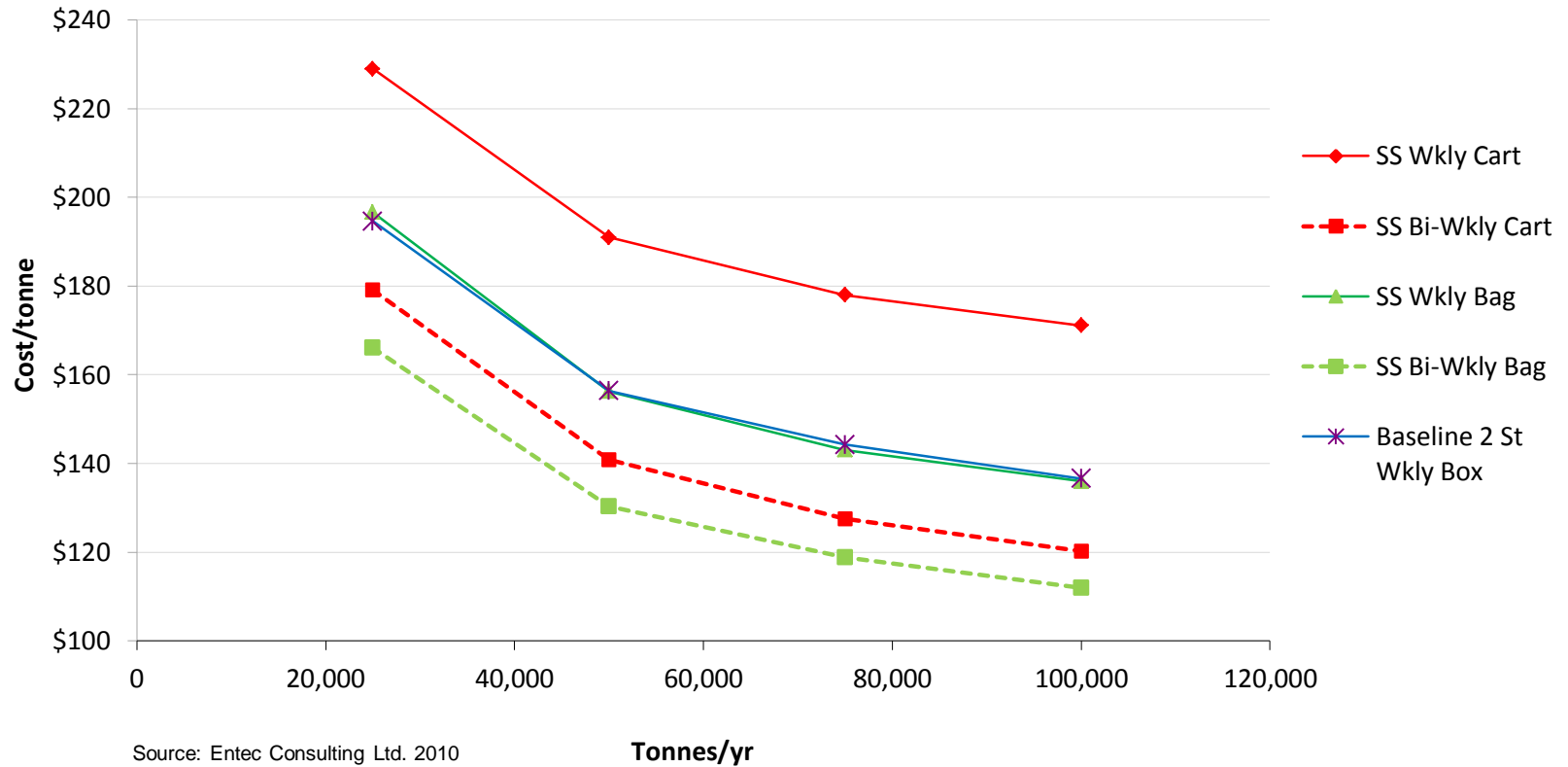


Source: Entec Consulting Ltd. 2010

# Net Processing Costs



# Net Collection & Processing Costs



# Benefit Comparison

Benefit Comparison	Bag	Box	Cart	Comments
Litter-free Recycling / Less Litter	✓	✗	✓	
Less Resin (Environmental Impact)	✓	✗	✗	Amount of resin used to manufacture 1 Cart is equivalent to a 14yr supply of bags for 1 Hhld*
No incremental capital required for Collection	✓	✗	✗	Municipality will require initial capital to purchase Blue Boxes/Carts. \$50 % funding carts for 200K Hhlds = \$6.5MM**
No incremental capital required for Processing	✗	✓	✓	Debagger required for processing Bags. Cost of Debagger = \$500K

\*Assumption: 2 Bags/Week for 52wks

\*\*Source: CIF 2010 Operations Plan, Dec 2<sup>nd</sup>, 2009

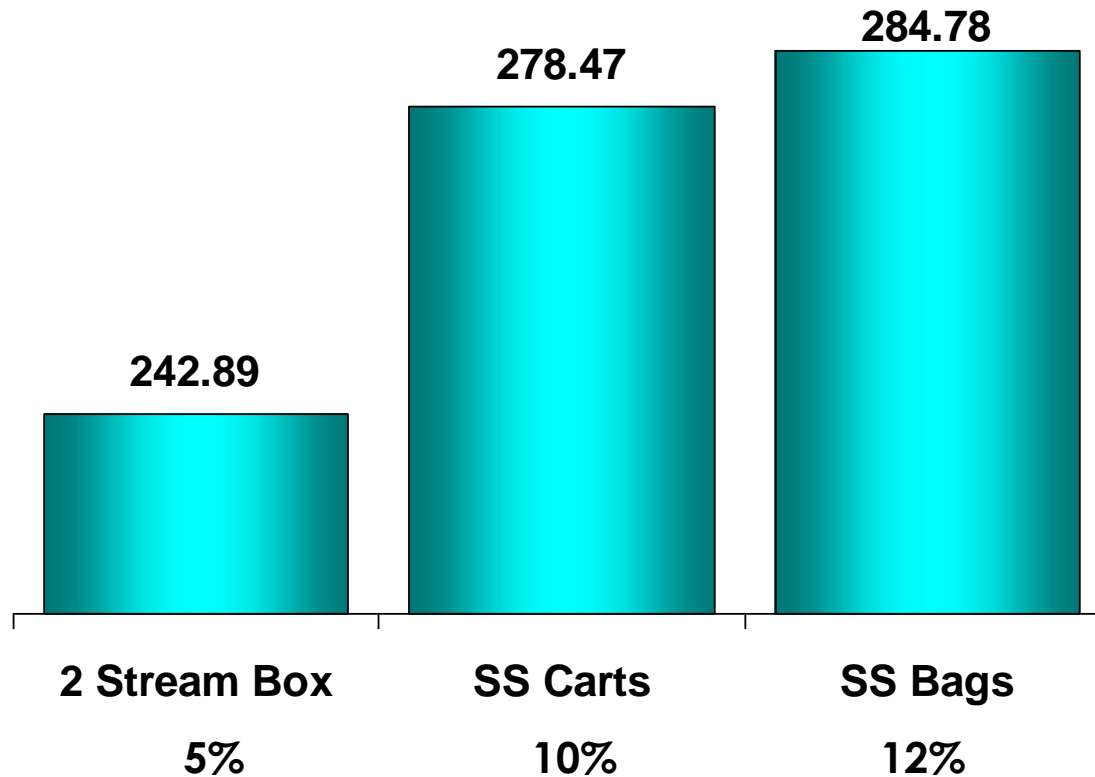
# Estimated Bag Breaking and Film Sorting Costs

MRF Location	Capital Cost/Tonne	Operating Cost/Tonne	Total Cost/Tonne
Edmonton	\$0.25	\$10.87	\$11.12
Northumberland	\$2.22	\$18.18	\$20.40
Peel	\$1.39	\$12.84	\$14.23
Charlottetown	-	\$ 11.88	\$11.88
Guelph	\$2.60	\$7.76	\$10.36
<b>Average</b>	<b>\$1.29</b>	<b>\$12.31</b>	<b>\$11.60</b>

Source: Entec Consulting Ltd. 2010

# Carts & Bags Capture More Material vs. Blue Box

Avg. Recycling Material kg/hh/yr



Source: City of Toronto Recycling Container Pilot Study - March 2009

# Studies suggest that Bag & Cart based Collection Systems improve diversion rates

## § Results of Individual Studies Reviewed:

- Markham (1994) - Bag capture rates 60% higher than Blue Box
  - Toronto Pilot Study, 2009 - no difference in recyclable capture rates between Carts vs. Bags (84.9% vs 84.2%)
  - Diversion rates are the highest in Provinces with bag-based programs i.e. PEI, NS, NB (Stats Canada 2006)
- 
- Evidence suggests that adopting bag or cart-based systems would increase diversion vs. the Blue Box system

# Summary of Findings

- There is no one system that is preferred by residents
  - *every system has its faults and none is perfect*
  
- Studies have demonstrated that capture rates are higher with bag or cart-based Systems (Markham 1994, Toronto, 2009)
  - *adopting bag or cart-based systems could significantly increase diversion rates*
  
- Automated cart systems have the highest net system cost & the initial municipal capital costs are also greater than that of a comparable bag program
  - *Diversion rates are the highest in Provinces with bag-based programs i.e. PEI, NS, NB (Stats Canada 2006)*
  
- Overall, blue bag & Blue Box are the most cost effective systems
  - *bag collection & processing systems (both weekly and bi-weekly) are less costly than automated cart system costs*

**Thank you for your time  
and interest.**

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